

ABSTRACT OF THE INVENTION

An array of unbalanced magnetrons arranged around a centrally-located space for sputter coating of material from target electrodes in the magnetrons onto a substrate disposed in the space. The electrodes are powered in pairs by an alternating voltage and current source. The unbalanced magnetrons, which may be planar, cylindrical, or conical, are arranged in mirror configuration such that like poles are opposed across the substrate space or are adjacent on the same side of the substrate space. The magnetrons are all identical in magnetic polarity, such that there is no magnetic coupling between either opposed or adjacent magnetrons. A positive plasma potential produced by the AC driver prevents electrons from escaping to ground along the unclosed field lines, increasing plasma density in the background working gas and thereby improving the quality of coating being deposited on the substrate.